REMARKS

Claims 1, 3-7, 10-13, 16-18, and 20-25 are currently pending in the application. By this response, no claims are amended, added, or canceled. Reconsideration of the rejected claims in view of the following remarks is respectfully requested.

35 U.S.C. §103 Rejections

Claims 1, 3-7, 10-13, 16-18, and 20-25 are rejected under 35 U.S.C. §103(a) for being unpatentable over U.S. Patent No. 5,752,025 issued to SHAKIB *et al.* ("SHAKIB") in view of U.S. Patent Application Publication No. 2002/0120617 issued to YOSHIYAMA *et al.*, U.S. Patent Application Publication No. 2001/00156428 issued to GAJDA *et al.* ("GAJDA"), and U.S. Patent Application Publication No. 2003/0088739 issued to Wilkes *et al.* ("WILKES"). This rejection is respectfully traversed.

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.[1] Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination

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[1] While the *KSR* court rejected a rigid application of the teaching, suggestion, or motivation ("TSM") test in an obviousness inquiry, the [Supreme] Court acknowledged the importance of identifying "a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does" in an obviousness determination. *Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356-1357 (Fed. Cir. 2007) (quoting *KSR International Co. v. Teleflex Inc.*, --- U.S. ----, 127 S.Ct. 1727, 1731 (2007)).

and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP §2142. Applicants submit that no proper combination of the applied art teaches or suggests each and every feature of the claimed invention.

As previously discussed, the present invention generally relates to optimization of database performance, and more particularly, optimization of performance in non-relational databases. In non-limiting exemplary implementations of the invention, a server provides database access and management control to a non-relational database. The server accepts database inquiries from one or more clients and accesses the database accordingly and returns the results of the inquiry. By reducing the view index size, implementations of the invention may increase efficiencies in processing time, bandwidth and/or memory management.

More specifically, in non-limiting implementations of the invention, at least one view of the database is created by defining columns. The view index size is kept at a level that optimizes database performance by categorizing and sorting only a first subset of the columns contained within the corresponding view. The remaining columns of the view constitute a second subset and are marked as having been indexed, but are not actually used to build the index. The second subset of columns may be visible as collapsed data to a client for issuing a query, since all columns are marked as indexed. When a query is performed on at least one column of the second subset, a sort and categorization of the at least one column is performed. This results in some data being indexed at run time. However, since the second subset of columns are not initially indexed, the total number of indexed records is substantially less, the view index size is reduced, and overall performance is increased.

Each of independent claims 1, 7, 18, and 25 recites, generally speaking: (i) marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns, (ii) the second set of columns is visible as collapsed data, and (iii) the database is a non-relational database. More specifically, representative independent claim 1 recites:

> 1. A method for optimizing performance of a database, the method comprising:
> sorting and categorizing a first set of columns within a view of the database;
> marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns, the second set of columns including all columns exclusive of the first set of columns; and
> sorting and categorizing at least one column of the second set of columns in response to performing a query on the at least one column,
> wherein the database is a non-relational database,
> the sorting and categorizing a first set of columns step includes assigning the first set of columns to a portion of a cache,
> the sorting and categorizing at least one column of the second set step includes sorting and categorizing at least one column of the second set of columns in another portion of the cache, and
> the second set of columns is visible as collapsed data.

For at least the reasons discussed below, Applicants submit that no proper combination of the applied art discloses or suggests the combination of features recited in the claimed invention.

(i) Contrary to the Examiner's assertions, YOSHIYAMA does not disclose or suggest: marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns

Each of independent claims 1, 7, 18, and 25 generally recites marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns. More specifically, claim 1 recites *marking a second set of columns within the view as if the second set of columns were*

already sorted and categorized prior to actual sorting and categorizing of the second set of columns; claim 7 recites *marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns*; claim 18 recites *a component to mark a second set of columns within the view, wherein the second set of columns comprises all columns within the view that are not in the first set of columns, and wherein the mark indicates that sorting and categorizing has been performed on the second set of columns without actually having performed the sorting and the categorizing*; and, claim 25 recites *a second computer program code to mark a second set of columns within the view, wherein the second set of columns comprises all columns within the view that are not in the first set of columns, and wherein the mark indicates that sorting and categorizing has been performed on the second set of columns without actually having performed the sorting and the categorizing.* These features are not shown or suggested by the applied references.

The Examiner asserts that SHAKIB discloses sorting and categorizing a first set of columns within a view of a database. The Examiner acknowledges, and Applicants agree, that SHAKIB does not disclose or suggest marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns, the second set of columns including all columns exclusive of the first set of columns. The Examiner, however, asserts that YOSHIYAMA teaches these features at paragraph [0035], and that it would have been obvious to modify SHAKIB by adding these features. Applicants respectfully disagree and submit that no proper combination of the applied references discloses or suggests this feature of the claimed invention.

SHAKIB discloses a method and system for creating and displaying a table of categorized data. The table, called a categorization table, is analogous to the well-known computer directory tree structure with expandable and collapsible headings (FIG. 3). More specifically, a plurality of data records 10 are accessed through a sorted index 12. A header table 14 references the plurality of data records 10 through the sorted index 12 (FIG. 1). The sorted index 12 contains a separate entry corresponding to each data record contained in the plurality of data records 10. The header table is traversed to create and display a categorization table on a display means (FIG. 3). SHAKIB does not, however, teach or suggest marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns. The Examiner correctly acknowledges as much.

YOSHIYAMA does not cure the above-noted deficiencies of SHAKIB. YOSHIYAMA discloses a database retrieval method that is based upon a comparison of costs of different retrieval techniques. The method is useful for irregular retrievals where an already generated index cannot be used in many cases. In the method, a structured query language (SQL) statement (i.e., query) is parsed (see paragraphs [0046] and [0058]; and FIG. 5). Based upon the parsing, a cost calculation is performed to determine the fastest way to access the database (see para. [0059]). The costs of three retrieval techniques are calculated: (i) access made by entire scanning on all of the data in the database; (ii) access made by using an already existing index or dynamic index; and (iii) access made by creating and using a dynamic index (see para. [0063]). The technique that is deemed the fastest is used to actually access the database and retrieve the data in response to the query (see para. [0063] – [0066]).

Applicants respectfully submit, though, that the Examiner is simply not correct that paragraph [0035] of YOSHIYAMA teaches the subject matter acknowledged to be missing from SHAKIB. Paragraph [0035] of YOSHIYAMA explains the following:

> [0035] With this program, a step of making a comparison between a cost required when retrieval is performed after an index corresponding to a retrieval condition is generated and a cost required when entire retrieval is performed is first executed in a block 1 of FIG. 1. Next, in a block 2, a step of determining whether or not an index that satisfies a retrieval condition and is applicable exists among already generated indexes is executed, if the cost required when the entire retrieval is performed is higher as a result of the cost comparison made in the block 1. In a block 3, a step of generating an index corresponding to the retrieval condition is executed if an applicable index is determined not to exist in the block 2. In a block 4, a step of retrieving a database by using the index generated in the block 3 is executed. These steps are executed by a computer.

While it is true that the above-noted language discusses retrieving a database and generating an index, there is no mention of marking a second set of columns within a view of a database as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns as required by the claimed invention. Indeed, the terms "marking" and "view" are no where to be found in the noted passage.

Applicants emphasize that YOSHIYAMA does not explicitly disclose a view of a database. Instead, YOSHIYAMA only teaches that non-indexed data may be accessed in one of three ways: by a full scan, by using portions of existing indexes, or by creating a new dynamic index. However, there is simply no mention of marking a second set of columns as categorized and sorted before they are actually categorized and sorted, as recited in the claimed invention.

In the Response to Arguments section of the Final Office Action, the Examiner asserts that "not indexing" is similar to marking and/or that "not indexing" is marking by default, and that YOSHIYAMA therefore teaches the recited marking. As an initial matter, Applicants submit that "similar" and "by default" are not the proper standards for determining patentability.

Instead, to establish *prima facie* obviousness of a claimed invention, all the claim limitations

must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA

1974). Being similar is not sufficient for a rejection under §103.

      Even further, Applicants submit that the contention "[n]ot indexing is similar to the

applicant's claimed marking. Not indexing is marking by default" is an improperly applied

assertion of inherency. MPEP §2112 provides the following guidance regarding rejections based

upon inherency:

> The fact that a certain result or characteristic may occur or be
> present in the prior art is not sufficient to establish the inherency of
> that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28
> USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because
> inherency was based on what would result due to optimization of
> conditions, not what was necessarily present in the prior art); *In re
> Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981).
> To establish inherency, the extrinsic evidence 'must make clear that
> the missing descriptive matter is necessarily present in the thing
> described in the reference, and that it would be so recognized by
> persons of ordinary skill. Inherency, however, may not be
> established by probabilities or possibilities. The mere fact that a
> certain thing may result from a given set of circumstances is not
> sufficient.' *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949,
> 1950-51 (Fed. Cir. 1999).
> …
> "In relying upon the theory of inherency, the examiner must provide
> a basis in fact and/or technical reasoning to reasonably support the
> determination that the allegedly inherent characteristic <u>necessarily</u>
> flows from the teachings of the applied prior art." *Ex parte Levy,* 17
> USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in
> original)

      Applicants respectfully submit that it does not necessarily flow from the teachings of

SHAKIB and YOSHIYAMA that "not indexing" is, by default, equivalent to the claimed recitation

of *marking a second set of columns within the view as if the second set of columns were already

sorted and categorized prior to actual sorting and categorizing of the second set of columns*. To

the contrary, Applicants submit that "not indexing" means only (and exactly) what it says: that portions of the data are not indexed. However, there is no implication in SHAKIB or YOSHIYAMA that such "non-indexing" of data necessarily means that the non-indexed data is marked as if it were actually indexed. Therefore, it is not inherent from the teachings of SHAKIB or YOSHIYAMA that YOSHIYAMA's "not indexing" is equivalent to Applicants' recitation of *marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns.*

Furthermore, as previously argued in the response dated June 15, 2007, Applicants submit that the Examiner's proffered reasoning that "[n]ot indexing is similar to the applicant's claimed marking. Not indexing is marking by default" is mere speculation, without any basis in fact or technical reasoning, as required by MPEP §2112. Applicants properly traversed this thinly veiled application of inherency in the previous response; however, the Examiner failed to address the traversal in the outstanding Office Action.

Applicants emphasize that YOSHIYAMA provides no suggestion whatsoever of marking a second set of columns within a view of a database as if the second set were already sorted and categorized prior to actually sorting and categorizing the second set of columns, and the Examiner has not demonstrated otherwise. Therefore, the applied references do not disclose or suggest all of the features of the claimed invention, and do not render the invention obvious.

(ii) The rejection is improper because it does not address the language of the claims, and because it is conclusory.

Applicants submit that the rejection is also improper because the Examiner's explanation does not address the actual language of the claims. Applicants note that MPEP §2143.03 states: "[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). Moreover, 37

C.F.R. §1.104 states: "[t]he examination shall be complete with respect both to compliance of the application or patent under reexamination with the applicable statutes and rules and to the patentability of <u>the invention as claimed</u> ..." (emphasis added). The Examiner's explanation of combining the teachings of SHAKIB and YOSHIYAMA merely asserts that "[n]ot indexing is similar to the applicant's claimed marking. Not indexing is marking by default." However, the claims recites more than mere "marking." Therefore, the rejection does not consider all of the words of the claim.

More specifically, the claimed invention recites *marking a second set of columns within the view* <u>*as if the second set of columns were already sorted and categorized prior to actual*</u> <u>*sorting and categorizing of the second set of columns*</u>. The Examiner's explanation fails to consider or address that the recited marking is as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns. That is, the Examiner fails to explain how SHAKIB or YOSHIYAMA discloses or suggests marking as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns. Therefore, the rejection fails to address the actual language of the claims, and should be withdrawn.

Additionally, Applicants submit that the rejection is improper because it is conclusory and does not set forth articulated reasoning to support the holding of obviousness. In the rejection, the Examiner acknowledges that SHAKIB does not disclose *marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns*. The Examiner, without any additional explanation, asserts that "YOSHIYAMA does teach this limitation at parg. 35

lines 6-15" (Final Office Action, page 5) and that "[n]ot indexing is similar to the applicant's

claimed marking. Not indexing is marking by default" (Final Office Action, page 2).

These two statements, taken together, amount to nothing more an unsupported assertion

that YOSHIYAMA discloses the feature at issue and an unsupported assertion of inherency that

does not even address the actual language of the claim. This type of rejection is clearly improper

since the Supreme Court has held that "rejections on obviousness grounds cannot be sustained by

mere conclusory statements; instead, there must be some articulated reasoning with some

rational underpinning to support the legal conclusion of obviousness." *KSR Int'l Co. v. Teleflex*

Inc., 550 U.S. _____ (2007), quoting *In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006).

Therefore, the rejection is improper and should be withdrawn.

> ### *(iii) The Examiner's purported reason for combining the features of the references is not applicable to SHAKIB, and would not have prompted the skilled artisan to make such a combination.*

Even assuming *arguendo* that YOSHIYAMA does disclose *marking a second set of*

columns within the view if the second set of columns were already sorted and categorized

prior to actual sorting and categorizing of the second set of columns, which Applicants dispute,

there is no applicable reason for modifying SHAKIB with such features. SHAKIB is directed to

a method of displaying all of the data contained in a plurality of data records. The data is

displayed in a categorization table that may have expanded or collapsed headings. All of the

data in the data records or sort index is necessarily categorized and sorted before it can be

displayed (col. 6, lines 33-35). Since SHAKIB is concerned with displaying all of the data, there

would be no motivation to leave some of the data un-categorized and un-sorted. Therefore, there

would be no motivation to mark a subset of columns categorized and sorted before they are

actually categorized and sorted.

*(iv) There is no reasonable expectation of success for modifying
SHAKIB in view of YOSHIYAMA as suggested by the Examiner*

Furthermore, and contrary to the Examiner's assertion, there is no reasonable expectation

of success that modifying SHAKIB with such features would "speed up data retrieval" in

SHAKIB. In fact, SHAKIB is not directed toward data retrieval in the same sense as

YOSHIYAMA. Instead, SHAKIB is directed toward the creation and display of a categorization

table that may have expanded or collapsed headings (see FIG. 3). YOSHIYAMA, on the other

hand, is directed toward a database management system (DBMS) and the selective retrieval of

data from a database based upon SQL statements (i.e., queries). SHAKIB makes no mention

whatsoever of a DBMS or queries. Therefore, the motivation proffered by the Examiner is

inapposite to SHAKIB, and there is no reasonable expectation of success of the proposed

modification of SHAKIB.

Moreover, Applicants note that the Examiner failed to address this argument that was

previously set forth in Applicants' response dated June 15, 2007. Applicants respectfully submit

that the Examiner has not answered the substance of. Instead, the Examiner was completely

silent with respect to Applicants' argument that there is no reasonable expectation of success for

modifying SHAKIB in view of YOSHIYAMA in the proposed manner. Accordingly,

Applicants respectfully submit that the Examiner did not provide a complete action.

*(v) The proposed modification of SHAKIB in view of GAJDA is
improper and has no reasonable expectation of success*

All of the independent claims 1, 7, 18, and 25 recite that the database is a non-relational

database. The Examiner acknowledges that SHAKIB and YOSHIYAMA do not teach or

suggest the use of a non-relational database. The Examiner, however, asserts that GAJDA

teaches a non-relational database, and that it would have been obvious to further modify

SHAKIB and YOSHIYAMA in view of the teachings of GAJDA.

Applicants respectfully disagree and submit that no proper combination of these

references discloses or suggests all of the features of the claimed invention. Applicants

acknowledge that GAJDA discloses a system that improves access to non-relational database.

However, because YOSHIYAMA explicitly relates to a <u>relational</u> database (see para. 0002),

those skilled in the art would not replace the <u>relational</u> database with the <u>non-relational</u> database

of GAJDA. In fact, Applicants submit that it would be impossible to combine the non-relational

database teachings of GAJDA with the relational database features of YOSHIYAMA, as

proposed by the Examiner. Those having ordinary skill in the art will recognize that such a

modification simply will not work. Thus, the rejection based upon SHAKIB, YOSHIYAMA,

and GAJDA is improper and should be withdrawn.

Moreover, Applicants submit that the Examiner failed to address the substance of this

argument that was previously set forth in Applicants' response dated June 15, 2007. Applicants

note that the Examiner does discuss, in the Response to Arguments section of the Final Office

Action, that GAJDA discloses a non-relational database. However, the Examiner's comments

fail to address the substance of Applicants' argument, *i.e.*, that there is no reasonable expectation

of success of combining the non-relational database teachings of GAJDA with the relational

database features of YOSHIYAMA. Accordingly, Applicants respectfully submit that the

Examiner did not provide a complete action.

(vi) The applied art does not disclose or suggest the second set of columns is visible as collapsed data

All of the independent claims 1, 7, 18, and 25 recite that the second set of columns

(which is marked as sorted and categorized but not actually sorted and categorized) is visible as

collapsed data. Applicants submit that this feature is not disclosed or suggested by the applied art.

In exemplary embodiments of the invention, at least one view of a database is created by defining columns. The view index size is kept at a level that optimizes database performance by categorizing and sorting only a first set of the columns contained within the corresponding view. The remaining columns of the view constitute a second set and are marked as having been indexed (i.e., sorted and categorized), but are not actually used to build the index (i.e., are not actually sorted and categorized). The second set of columns may be visible as collapsed data to a client for issuing a query, however, since all columns are marked as indexed. When a query is performed on at least one column of the second set, a sort and categorization of the at least one column is performed. This results in some data being indexed at run time. However, since the second set of columns are not initially indexed, the total number of indexed records is substantially less, the view index size is reduced, and overall performance is increased.

No combination of SHAKIB, YOSHIYAMA, GAJDA, and WILKES discloses or suggests second set of columns (which is marked as sorted and categorized, but is not actually sorted and categorized) is visible as collapsed data. The Examiner asserts that YOSHIYAMA teaches this feature at paragraph 35 (see, e.g., pages 3, 5, and 7 of the Final Office Action).

Applicants respectfully disagree, and submit that paragraph 0035 of YOSHIYAMA makes not mention whatsoever of a set of columns being visible as collapsed data, much less that a second set of columns which is marked as sorted and categorized, but is not actually sorted and categorized, is visible as collapsed data. Accordingly, Applicants respectfully request that the Examiner clarify this rejection by explaining exactly how YOSHIYAMA discloses or suggests this feature of the claimed invention.

For all of the above-discussed reasons, Applicants submit that the applied references fail to render obvious the invention recited in independent claims 1, 7, 18, and 25. Moreover, Applicants submit that claims 3-6, 10-13, 16, 17, and 20-21 depend from allowable independent claims, and are allowable based upon the allowability of the respective independent claims.

Accordingly Applicants respectfully request that the §103(a) rejection of claims 1, 3-7, 10-13, 16-18, and 20-25 be withdrawn.

Improper Final Rejection

As discussed above, Applicants note that the Examiner failed to address and answer the substance of arguments that was presented in Applicants' previous response. According to MPEP §707.07 the "Examiners action will be complete as to all matters ...." Additionally, the Examiner is directed to MPEP §707.07(f), which states:

> In order to provide a complete application file history and to enhance the clarity of the prosecution history record, an examiner must provide clear explanations of all actions taken by the examiner during prosecution of an application.
> . . .
>
> Where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of applicant's argument and answer the substance of it.

Applicants respectfully submit that the Examiner has not answered the substance of Applicants' arguments that: (a) YOSHIYAMA does not "by default" (i.e., inherently) disclose or suggest *marking a second set of columns within the view as if the second set of columns were already sorted and categorized prior to actual sorting and categorizing of the second set of columns*, (b) there is no reasonable expectation of success for modifying SHAKIB in view of YOSHIYAMA in the proposed manner, or (c) there is no reasonable expectation of success of

combining the non-relational database teachings of GAJDA with the relational database features

of YOSHIYAMA. Accordingly, Applicants respectfully submit that the Examiner did not

provide a complete action.

The Examiner is reminded that a clear issue must be developed between the Examiner

and Applicant before a rejection can be made final, as set forth in MPEP §706:

> Before final rejection is in order a <u>clear issue</u> should be developed
> between the examiner and applicant. To bring the prosecution to as
> speedy conclusion as possible and at the same time to deal justly by both
> the applicant and the public, the invention as disclosed and claimed
> should be thoroughly searched in the first action and the references fully
> applied; and in reply to this action the applicant should amend with a
> view to avoiding all the grounds of rejection and objection.

Because the Examiner did not address the above-noted arguments, Applicants submit that

"clear issue [was not] developed between the examiner and applicant". Therefore, the finality of

the outstanding Office Action should be withdrawn, and a new non-final Office Action clarifying

these matters should be issued.

CONCLUSION

In view of the foregoing remarks, Applicants submit that all of the claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue. The Examiner is invited to contact the undersigned at the telephone number listed below, if needed. Applicants hereby make a written conditional petition for extension of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 09-0457.

Respectfully submitted,
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